FOLDING ORIGAMI FROGS

DATA COLLECTION ACTIVITIES

NA00656_[1]

**Folding Origami Frogs**

**Objectives**

* Understand histograms, parallel box plots, and scatter plots and use them to display data.
* For bivariate measurement data, be able to display a scatterplot, describe the shape, and determine .regression coefficients, regression equations, and correlation coefficients using technological tools. (Graphics calculator if available.)
* Build new mathematical knowledge through problem solving.

**Student Expectations**

The student will:

* fold origami frogs using various sizes of paper.
* collect, organize, and analyze data found by jumping frogs.
* draw box-plots and histograms on graph paper and then using appropriate technology.
* draw a scatterplot on graph paper, draw a line of fit, and write the equation of the best fit line.
* make predictions using the best-fit line equation, if graphics calculators are available.

**Materials**

[](http://www.google.com.au/imgres?imgurl=http://www.cksinfo.com/clipart/animals/frogs/frog2.png&imgrefurl=http://www.cksinfo.com/animals/frogs/index.html&usg=__14U6wAA2JitcCqSx06MRNvPxRsI=&h=412&w=407&sz=39&hl=en&start=7&um=1&itbs=1&tbnid=lcsIn1TdkZBZGM:&tbnh=125&tbnw=123&prev=/images?q=free+clip+art+frogs&um=1&hl=en&sa=X&rlz=1T4GGLL_enAU353AU354&tbs=isch:1)different sizes of paper

tape measures

scissors

activity sheets

[graphics calculator]

rulers

[computer]

**Overview**

This series of frog jumping activities is designed to allow each student the opportunity to collect his or her own data. Using this data, each student will construct box-plots, histograms, scatter plots. The student will read, interpret and make predictions using graphs and tables with appropriate technology.

**Prerequisites**

Students need to know:

* how to plot points on a set of coordinate axes.
* how to write an equation given two points.
* how to make a frequency distribution.
* how to enter data in a graphing calculator.
* how to use technology to graph data.

**Teacher’s Notes**

* Make sure **you** know how to fold the frog before attempting to teach **your** class. You can find several videos on You-Tube to see it done! (Enter folding Origami frogs) You will find instructions below but you might want to use a different method.
* It is helpful to fold the frog one step at a time and number or label what step you are doing each time. This can be used for students that are having a hard time in keeping up or for the student who is absent.
* Encourage students to name their frog or decorate it. Use color pencils not markers when decorating the frog. Getting each student involved will create a great atmosphere for learning mathematics.
* Develop guidelines that will ensure consistency in jumping the frogs before you have the actual jumping contest.
* Let students make several frogs and practice jumping them. (These frogs can be decorated.) For the actual contest, after the frog is folded, limit the frog to two practice jumps.
* Investigate the idea of your students going to another math class and teaching the students how to fold frogs.
* Do not forget to take plenty of pictures of your students and create a bulletin board to brag on your students.

[](http://www.google.com.au/imgres?imgurl=http://www.pixabella.com/wp-content/uploads/2009/01/valentinefrog.png&imgrefurl=http://www.pixabella.com/plugin/tag/frog&h=400&w=460&sz=141&tbnid=WcUMpeSBoyQTxM:&tbnh=111&tbnw=128&prev=/images?q=free+clip+art+frogs&usg=__tRFaK3-hDQj08xj2cepANZAiBZ4=&sa=X&ei=QJdiTMqgEYm8vgOP_uyeCg&ved=0CCcQ9QEwAw)**Frog Activity #1**

**Name:………………**

1. Using a piece of A4 paper, fold an origami frog.

2. Think about the guidelines for consistency in jumping the frogs. (Example: position of the nose of the frog when jumping, what if the frogs turns sideways, etc.)

3. Tape a tape measure to your desk or table. Practice jumping the frog.

4. Jump the frog twenty-five times. Keep an accurate record of the length of each jump. (See the provided chart.)

5. Using **your data,** construct a frequency distribution. (See the provided chart.)

6. On a piece of graph paper construct a histogram using your frequency distribution. Label each axis.

7. Use your calculator to find the 5 number summary. Use this information to construct a box plot (box and whisker) on the same piece of graph paper above the histogram.

8. Use your graphing calculator to draw a histogram and box plot at the same time. Compare your hand written graphs with those drawn with the graphing calculator.

9. Write a paragraph that explains the histogram and boxplot.

**Activity #1**

Jump Length Jump Length

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3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_16\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_17\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_18\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_19\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_20\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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11\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_24\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_25\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Frequency Distribution**

Class Interval Tally Marks Frequency Relative Frequency

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**Frog Activity #2**

1. As a class decide how to measure the length of the frog (body, nose to tip of leg folded or unfolded, etc.) Measure the length of the frog in centimetres.

2. Record the length of your frog and the average of the jumps from activity 1.

3. Using the recorded class information, construct on graph paper a scatterplot with the length (size) of the frog (x) versus the mean of the jumps (y). (Be sure to label both axes.)

4. Draw a line of fit. (A line of fit is a line that lies as close as possible to all the points in a scatter plot. It does not have to pass through any of the points.)

5. Choose 2 points that are on **your** line. Find the slope.

6. Using the slope and one of the points, find **your** y-intercept.

7. Find the equation of **your** line of fit in slope-intercept form. Do you think your equation is a good predictor? Why or why not?

8. Using **your** equation of line of fit, predict the length of the jump of a frog whose length is 25 centimetres and the length of the jump of a frog whose length is 2 centimetres.

9. Using **your** equation predict what the length of a frog would have to be if its mean jump was 150 centimetres and what the length of a frog would have to be if the mean jump was 10 centimetres.

10. Use your graphing calculator and the class data to construct a scatterplot. Enter the class data in List 1 and List 2 of your graphing calculator. (You may name your lists.)

11. Use your calculator to find the regression equation. The computer and graph link can be used to print the scatterplot and regression equation.

12. Use your calculator equation and predict the length of the jump of a frog whose length is 25 centimetres and the length of the jump of a frog whose length is 2 centimetres.

13. Use your calculator equation and predict what the length of a frog would have to be if its mean jump was 150 centimetres and predict what the length of a frog would have to be if the mean jump was 10 centimetres.

14. Write a report about your experiment. Include a paragraph on each of these points:

* goals of the experiments
* descriptions of your procedure
* tables and graphs of your data
* conclusions based on your results

**http://www.clipart-directory.com/clipart/frog/tn_FROG01.gif**

**Frog Activity #2**

Length of your frog\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(in centimetres)

Mean(average) jump of your frog\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Slope of your line of fit\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

y-intercept of your line\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Equation of your line\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(slope-intercept form)

**Using the equation that you wrote:**

Predict length of jump of a frog whose length is 25 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of jump of a frog whose length is 2 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of a frog if its mean jump is 150 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of a frog if its mean jump is 10 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Using the equation that the calculator computed:**

Record the calculator equation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of jump of a frog whose length is 25 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of jump of a frog whose length is 2 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of a frog if its mean jump is 150 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict length of a frog if its mean jump is 10 centimetres\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

